

APOON MOUTH, YUKON RIVER, ALASKA.

LETTER

FROM

THE SECRETARY OF WAR,

TRANSMITTING

WITH A LETTER FROM THE CHIEF OF ENGINEERS, REPORT ON
PRELIMINARY EXAMINATION OF THE APOON MOUTH OF THE
YUKON RIVER, ALASKA, FROM THE IMPROVEMENT NOW UNDER
WAY TO DEEP WATER.

MAY 20, 1914.—Referred to the Committee on Rivers and Harbors and ordered to be
printed, with illustrations.

WAR DEPARTMENT,
Washington, May 19, 1914.

The SPEAKER OF THE HOUSE OF REPRESENTATIVES.

SIR: I have the honor to transmit herewith a letter from the Chief of Engineers, United States Army, of even date, together with copy of a report from Maj. J. B. Cavanaugh, Corps of Engineers, dated December 15, 1913, with map, and a copy of supplemental report from the same officer dated April 19, 1914, upon a preliminary examination of the Apoon mouth of the Yukon River, Alaska, made by him in compliance with the provisions of the river and harbor act approved March 4, 1913.

Very respectfully,

LINDLEY M. GARRISON,
Secretary of War.

WAR DEPARTMENT,
OFFICE OF THE CHIEF OF ENGINEERS,
Washington, May 19, 1914.

From: The Chief of Engineers, United States Army.

To: The Secretary of War.

Subject: Preliminary examination of the Apoon mouth of the Yukon River, Alaska.

1. There is submitted herewith, for transmission to Congress, report dated December 15, 1913, and supplemental report dated April 17, 1914, by Maj. J. B. Cavanaugh, Corps of Engineers, on preliminary examination of the Apoon mouth of the Yukon River, Alaska, from the improvement now under way to deep water, called for by the river and harbor act approved March 4, 1913.

2. The Apoon mouth is the most easterly of the delta channels into which the Yukon River divides, and is used by all vessels plying between points on the river and the port of St. Michael. The original and existing project for improvement of this branch of the river, adopted by the act approved July 25, 1912, provides for a channel 6 feet deep at mean low water, 150 feet wide through the bars, and 200 feet wide at the bends. The present improvement extends to the mouth of Pastolik River, and the improvement contemplated by the act is understood by the district officer to extend from the mouth of that river to deep water for river vessels, or to a depth of approximately 6 feet below mean lower low water. He states that not only would the first cost of a suitable channel across these extensive flats at the mouth of the river be excessive, but its maintenance would also be impracticable within reasonable limits of cost. He therefore expresses the opinion that the additional improvement now proposed is not worthy of being undertaken by the General Government, and in this view the division engineer concurs.

3. These reports have been referred, as required by law, to the Board of Engineers for Rivers and Harbors, and attention is invited to its report herewith, dated May 6, 1914. At a hearing held by the board on February 24, 1914, interested parties expressed a desire for the widening of the channel at the turn opposite the mouth of the Pastolik River, the removal of such shoaling as had occurred in the improved reaches, and the dredging of a shallow channel through the so-called "hogback" or crest of the shoal a short distance beyond the mouth of the river, and these improvements are discussed in the supplemental report of the district officer, dated April 17, 1914. The board states that the work of restoring the channel where dredging has been done, and of easing the point complained of, can be done under the existing project with funds now on hand. The removal of the "hogback" would be new work, and its cost is considered excessive when compared with resulting benefits. The board therefore expresses the opinion that it is not advisable for the United States to undertake the improvement of this locality to a greater extent than is authorized by the existing project.

4. After due consideration of the above-mentioned reports, I can not concur with them in their limitation. I think that it would be justifiable to go further in the improvements than the local engineer and the Board of Engineers for Rivers and Harbors have recom-

mended. I have been in Alaska and am familiar with the character of the navigation on the Yukon, and know that the improvement is a vital one, and it affects the welfare of the whole Territory. Ocean navigation must end at St. Michael, and there the mode of transportation must be changed from ocean steamers to river steamboats and barges. These are light, fragile structures, such as are found on the tributaries of the Mississippi River. The trip of a steamboat towing barges and carrying freight and passengers from St. Michael to the Yukon River is not without peril, and the danger is augmented if it reaches the Apoon Pass and is not able to enter the sheltered waters in the river, but is forced to wait for favorable conditions of wind and tide. An increase of depth a foot or two is of the greatest value and importance to such vessels, and may determine the question of success or failure of a transportation line. All work is expensive in Alaska, and any improvement in transportation facilities is valuable in proportion to the increased cost of everything there.

5. I am of the opinion that such expenditure would be justifiable as is necessary to provide for the removal of such shoaling as has occurred in the improved reaches, and for widening and straightening the channel at the turn opposite the mouth of the Pastolik River, and for dredging a channel through the so-called "hogback" a short distance beyond the mouth of the river. From the district officer's supplemental report of April 17, 1914, it appears that the cost of dredging a channel through the "hogback" sufficiently deep to permit the dredge, which draws 6 feet, to work, and of a width of from 250 feet to 300 feet, would be about \$45,000. In my opinion, the expenditure of this amount is advisable under the conditions which prevail at the locality, and I therefore recommend that this amount be appropriated for this purpose.

DAN C. KINGMAN,
Chief of Engineers, United States Army.

REPORT OF THE BOARD OF ENGINEERS FOR RIVERS AND HARBORS.

[Third indorsement.]

THE BOARD OF ENGINEERS FOR RIVERS AND HARBORS,
May 6, 1914.

To the CHIEF OF ENGINEERS, UNITED STATES ARMY:

1. This is a report of preliminary examination of the Apoon mouth of the Yukon River, Alaska, from the improvement now under way to deep water, submitted in compliance with the act of March 4, 1913.

2. The Apoon mouth of the Yukon is the most easterly of the several delta channels through which the river empties. It is used by all steamers plying between St. Michael and points on the Yukon River. The locality under consideration extends from the mouth of the Pastolik River to deep water in the bay. The distance across the bar by the route now used to a point $3\frac{1}{2}$ feet deep at mean lower low water is about $5\frac{1}{2}$ miles, and it is 5 to 8 miles farther to a depth of 6 feet. The commerce involved is carried on steamboats and on barges

in tow. It amounts to about 25,000 to 30,000 tons, having a value of about \$3,000,000.

3. In a report submitted in 1911, printed in House Document No. 556, Sixty-second Congress, second session, it was stated that to extend a channel across the flats in the bay so as to make boats entering or leaving the Apoon mouth independent of the tide would involve considerable work, and the probable annual cost of maintenance would about equal the first cost of dredging unless the channel were protected by jetties heavy enough to resist the ice movement. The district officer states that the present investigation indicates that these conclusions were thoroughly sound, and based on the results of his preliminary examination he reports the locality as not worthy of improvement.

4. As a result of the district officer's notification of unfavorable report a hearing was given at the office of the board on February 24, 1914, at which it was stated by parties representing the principal interests concerned that they realized the great cost of securing a navigable channel through the flats at low water and that this would not be urged. They desired, however, some widening of the channel at the turn opposite the mouth of the Pastolik River, the removal of such shoaling as had occurred in the improved reaches, and the dredging of a shallow channel through the so-called "hogback," or crest of the shoal, a short distance beyond the mouth of the river. It appears that the depth over this shoal at low water is only about $1\frac{1}{2}$ feet and that even on the tide vessels sometimes ground and are considerably delayed.

5. The papers in the case were returned to the district officer for investigation of these questions, and under date of April 17, 1914, he submits a supplemental report in which he states that the removal of such shoaling as may have taken place and the widening of the channel at the turn opposite the mouth of the Pastolik River will be effected under the existing project to the extent possible with available funds. The additional depth desired through the hogback, although requiring dredging to a depth of only about 1 foot, would be quite expensive on account of the draft of the dredge exceeding the depth proposed. The district officer states that the cost could not be justified under ordinary conditions, but might be considered as in line with the general policy of lending unusual aid toward transportation in Alaska, and on this basis might be recommended. In this view the division engineer concurs. A representative of the interests concerned again appeared before the board on May 5, 1914, in advocacy of the improvement desired.

6. As stated by the district officer, the work of restoring the channel where dredging has been done under the existing project and of easing the point mentioned by interested parties can be done under the existing project with funds now in hand, and no extension of the project is required for this purpose.

7. It appears from the information available that the cost of securing the small increase of 1 foot in depth across the bar would be excessive when compared with the resulting benefits. Moreover, it seems quite probable that such a channel would deteriorate rapidly, if not entirely disappear, with each spring freshet and outflow of ice. In view of the conditions described above, the board reports that

in its opinion it is not advisable for the United States to undertake the improvement of the Apoon mouth of the Yukon River to a greater extent than is authorized by the existing project.

8. In compliance with law, the board reports that there are no questions of terminal facilities, water power, or other related subjects which could be coordinated with the suggested improvement in such manner as to render the work advisable in the interests of commerce and navigation.

For the board:

W. M. BLACK,
*Colonel, Corps of Engineers,
Senior Member of the Board.*

PRELIMINARY EXAMINATION OF APOON MOUTH, YUKON RIVER,
ALASKA.

UNITED STATES ENGINEER OFFICE,
Seattle, Wash., December 15, 1913.

From: The District Engineer Officer.

To: The Chief of Engineers, United States Army
(Through the Division Engineer).

Subject: Preliminary examination of Apoon mouth of Yukon River,
Alaska.

1. In compliance with the provisions of the act of Congress approved March 4, 1913, I have to submit the following report of a preliminary examination of the Apoon mouth of the Yukon River, Alaska, from the improvement now under way to deep water, with map as required.

2. A previous examination of this locality is reported in House Document No. 556, Sixty-second Congress, second session.

3. *Description.*—The Apoon mouth of Yukon River is the most easterly of the delta channels into which this river divides. It is shown in detail on United States Geological Survey Chart No. 9372, the most recent copy of which also shows the aids to navigation corrected to June 3, 1913, the hydrography being based on surveys of 1898 and 1899. This mouth or pass is used by all steamers plying between points on the Yukon River and its tributaries, and the port of St. Michael which is the transfer point between ocean steamers and river steamers. The Apoon mouth empties into Pastol Bay which for many miles out is very shallow so that the ocean swells are broken up and dissipated long before reaching the shore. This mouth is the only one that can safely be used by the shallow-draft river steamers, which are so lightly constructed that it is dangerous for them to venture into rough water. The route usually traveled by these steamers follows close inshore from Pastolik River to the mouth of the Pastoliak River, where a turn to the northward is made and a direct course laid to Point Romanof. From this point the course lies directly toward the pass between Stuart Island and St. Michael Island.

4. The present improvement extends to the mouth of Pastolik River, and the expression in the law "from the improvement now under way to deep water" is understood to mean from the mouth of

this river to deep water for river vessels, or to a depth of approximately 6 feet below mean lower low water, which has been provided in the Apoon mouth proper. The steamers in use have maximum dimensions of 222 feet 8 inches by 42 feet 2 inches and maximum draft of 5 feet 10 inches. Much of the traffic is carried on in barges which have maximum dimensions of 170 feet by 40 feet and a maximum draft of 5 feet 2 inches. The ordinary tow consists of a steamer and two or three barges.

5. An examination of routes from the ocean end of Apoon Pass to St. Michael was made by Mr. E. I. Pease, inspector, during July and August, 1913. In Pastol Bay the governing depth over the bar or flats is about 2 feet at mean lower low water, the range of tide being 3 feet 3 inches. From the mouth of Pastolik River to the inner 6-foot contour inside the bar is a distance of about 1 mile by the channel. On the route used at the present by the river steamers, the examination showed a depth of $3\frac{1}{2}$ feet at mean lower low water at a point $5\frac{1}{2}$ miles beyond the 6-foot contour inside the bar, and rough soundings taken from a steamboat beyond this point indicate that a depth of 6 feet could not be reached in less than 5 to 8 miles further. Soundings were also taken on another line starting from the end of the 6-foot contour inside the bar but bearing about $14^{\circ} 36'$ north of the usually traveled route, and on this line the depth had gradually increased to $5\frac{1}{2}$ feet at a distance of 8 miles from the 6-foot contour. The material to be dredged by both routes is the same, being apparently the fine sand and silt found in the dredged portion of the river proper. This examination shows practically the same conditions found by Mr. F. S. Greely on the original survey in 1911, as published in the report on previous examination printed in House Document No. 556, Sixty-second Congress, second session. From the conditions found at that time the following conclusions were reached:

To extend this channel (Apoon Mouth Channel) across the flats in Pastol Bay so as to make boats entering or leaving the Apoon mouth independent of the tide, would involve considerable work, and due to the leveling action of the ice floes the annual cost of maintenance would probably equal the first cost of dredging unless the channel were protected by jetties heavy enough to resist the ice movement. * * *

After careful consideration of all the facts, the conclusion is reached that no work should be done toward dredging the channel across the flats in Pastol Bay, but that the channel in the pass leading up to the flats of the bay can be advantageously improved and that such work should be undertaken by the United States if the cost is not excessive.

The results of the present examination indicate that these conclusions were thoroughly sound, for not only would the first cost of a suitable channel across these extensive flats at the mouth of the river be excessive, but its maintenance would also be impossible within any reasonable limits of cost. Moreover, the improvement of the river proper recently completed will eliminate all delays to traffic except the wait for high tide now necessary in order to cross the flats under consideration.

6. Referring to special subjects of inquiry named in section 3 of the river and harbor act of 1910, the following is submitted:

The terminals at St. Michael are all situated on the Government reservation; the wharves are not public wharves, but the Federal ownership of the shores is a sufficient guaranty against monopoly. There are no railroads in this part of Alaska and no mechanical appli-

ances for handling freight; the existing depths at the wharves are not sufficient to permit ocean-going vessels to approach them, and all freight has to be lightered, most of it being unloaded directly into the barges which carry it up the river. The existing wharves are sufficient for present commerce and public space is available for the construction of additional wharves when needed. The construction of Alaskan railroads by the Government, now under consideration, would probably cause a decrease in the present commerce passing through St. Michael and thence up the Yukon River, since a terminal at Cordova and terminals on the Yukon River or its tributaries will make it possible to send freight up the Yukon River during the entire time that the river is open to traffic, for between five and six months every year. At the present time traffic from St. Michael can be sent up the Yukon River for only about three months in the year—July, August, and September.

The subjects of development of water power, the prevention of floods, and the reclamation of land do not enter into consideration of the question of this improvement.

7. The following is a statement of the commercial statistics of the port of St. Michael, Alaska, for the years 1909, 1910, 1911, and 1912, collected from the port customhouse and the records of the Northern Navigation Co. at St. Michael, Alaska:

	1909	1910	1911	1912
ARRIVALS.				
River steamers.....	96	57	48	39
River barges.....		63	83	59
Registered net tonnage (both).....	52,695	64,404	57,582	44,118
Landed from river boats, tons.....		160	215	214
Value of goods landed from river boats.....		\$97,125	\$101,480	\$101,008
Gold dust and bullion landed from river boats.....		\$1,401,075	\$2,891,204	\$2,596,626
Passengers landed from river boats.....		2,029	1,286	1,417
SAILINGS.				
River steamers.....	114	53	50	38
River barges.....		64	95	63
Registered net tonnage (both).....	61,187	66,838	60,778	47,119
Total shipped to up-river points, tons.....	29,921	24,462	33,144	24,997
Total value of merchandise shipped to up-river points.....		\$2,538,830	\$3,399,860	\$2,972,094
Passengers sent out on river boats.....		575	390	376

8. No exact figures could be obtained on the commerce of the present year (1913), but the manager of the Northern Navigation Co. stated that the traffic up to July 15 was in excess of that for the same period in 1912. It is probable that commerce from St. Michael to up-river points will remain practically constant for some time to come, unless new conditions develop in regard to railroad and steamboat service in the interior.

9. In view of the limited commerce affected, and the unfavorable physical conditions which make the cost of both original construction and maintenance excessive, I am of the opinion that the improvement of the Apoon mouth of Yukon River, Alaska, from the improvement now under way to deep water, is not worthy of being undertaken by the Federal Government at the present time.

J. B. CAVANAUGH,
Major, Corps of Engineers.

[First indorsement.]

UNITED STATES ENGINEER OFFICE,
NORTHERN PACIFIC DIVISION,
San Francisco, Cal., December 19, 1913.

To the CHIEF OF ENGINEERS, UNITED STATES ARMY:

Concurring in the views expressed by the district engineer officer.

THOS. H. REES,
*Lieutenant Colonel, Corps of Engineers,
Division Engineer.*

[For report of the Board of Engineers for Rivers and Harbors, see page 3.]

SUPPLEMENTAL REPORT ON APOON MOUTH, YUKON RIVER, ALASKA

UNITED STATES ENGINEER OFFICE,
Seattle, Wash., April 17, 1914.

From: The District Engineer Officer.

To: The Chief of Engineers, United States Army.

(Through the Division Engineer.)

Subject: Report on Yukon River, Alaska, Apoon mouth.

1. The following supplemental report on the Apoon mouth of the Yukon River is submitted.

2. At the hearing before the Board of Engineers three things were urged by those interested as necessary to secure the maximum improvement of the locality reasonably justified by the commerce affected:

The removal of shoaling reported to have occurred during unusual storms in October, 1913;

Widening the channel at the turn opposite the mouth of the Pastolik River;

The dredging of a channel through the so-called "hogback" just beyond this point.

3. The first two items come within the approved project for the Yukon River, and it was the intention of this office to apply the available funds to the desired widening of the channel, if reasonable arrangements could be made for the execution of the work by the dredge now on the ground. No shoaling has ever been reported to this office, and its existence can not be determined until after the opening of navigation, in June next, when a survey party will be sent to Alaska. If shoaling exists, it can be removed as far as available funds permit; and if extensive, additional funds may be allotted from the emergency appropriation, but in this case the desired widening must necessarily be omitted.

4. The existence of the shoal or "hogback" mentioned, with its crest about 7,000 feet beyond the 6-foot curve at the mouth of the river, was shown by the last survey. Its length between the 2-foot contours is approximately half a mile, and the limiting depth on the crest was found to be about 1½ feet, a few soundings apparently on lumps thrown up by grounded steamers showing slightly less depth. Therefore, the dredging of a channel over this distance would apparently increase the available depth by less than 1 foot.

On the other hand, since the draft of the dredge is about 6 feet and the channel is in the open sea, requiring a width of 250 to 300 feet to be of value, the amount of material to be removed to secure this slight increase in depth would be relatively large, probably not less than 50,000 yards, which at prices heretofore paid in this locality would cost about \$45,000 for removal. Such an expenditure could not be justified under ordinary conditions, but in view of the representations made to the board as to the great value to the light-draft vessels of any slight increase in this limiting depth, provision for this work might possibly be considered as in line with the general policy of lending unusual aid toward transportation in Alaska, and recommendation to that effect might be made to Congress.

5. Had any special information or arguments been supplied this office in reference to the removal of the "hogback" and the special value of any slight increase of depth over it, even if the 6-foot channel could not be extended to deep water, the matter would have been treated in the original report.

6. It is understood to be the intention of the dredging company to bring the dredge down from Alaska this season unless there is a reasonable prospect of additional work for it.

Therefore provision for further work, if any is to be undertaken at the mouth of the Yukon River, should be made at this session of Congress if possible.

J. B. CAVANAUGH,
Major, Corps of Engineers.

[Third indorsement.]

UNITED STATES ENGINEER OFFICE,
NORTHERN PACIFIC DIVISION,
Portland, Oreg., April 20, 1914.

To the CHIEF OF ENGINEERS:

1. Forwarded.

2. The improvement of the bar channel so as to make boats entering and leaving the Apoon mouth independent of the tide was reported on adversely at the time of the original preliminary examination and survey (H. Doc. No. 556, 62d Cong., 2d sess.). In the district officer's preliminary examination report of December 15, 1913, it is again reported that this improvement is inadvisable. The request of certain local interests, preferred at the hearing of February 24, 1914, before the Board of Engineers for Rivers and Harbors, is that a channel $2\frac{1}{2}$ feet deep be provided through the crest of the bar where the governing depth is now $1\frac{1}{2}$ feet. The district officer points out that this work will be expensive, since dredging will suffer interruption at each low tide unless material is removed below the depth desired. The only dredge now in these waters draws 6 feet.

3. I concur with the district officer that except under a policy of lending unusual aid to transportation in Alaska, this improvement is not an advisable one for the United States to undertake at the present time.

C. H. MCKINSTRY,
Lieutenant Colonel, Corps of Engineers,
Division Engineer.

SAN FRANCISCO, December 19, 1913.

List of American steamers operated on Yukon River from St. Michael, Alaska, via Apoon mouth.

Official number.	Name.	Tonnage.		Dimensions.			Capacity.
		Gross.	Net.	Length.	Breadth.	Depth.	
				Feet.	Feet.	Feet.	Tons.
260095	Alice (new).....	262	145	110.6	24.5	4.6	100
107253X	Alice (old).....	400	200	160.0	33.0	8.0	200
107353X	Arnold.....	692	389	181.0	36.5	6.7	275
3959X	Bella.....	370	185	140.0	33.0	8.0	125
127254X	C. H. Bradley.....	29	20	69.7	11.4	4.5	(1)
127290X	C. H. Hamilton.....	595	297	190.0	38.0	5.5	200
202463	Delta.....	293	237	120.3	26.0	4.4	100
157509X	D. R. Campbell.....	718	409	176.1	35.4	5.9	300
121071X	F. K. Gustin.....	718	409	176.1	35.4	5.9	300
96428X	Hannah.....	1,211	639	222.8	42.0	6.2	475
96398	Herman.....	456	164	155.0	36.0	6.6	200
111182X	Ida May.....	278	267	150.0	32.0	4.0	75
100779X	Isabella.....	162	76	87.3	20.2	4.1	40
77334X	John Cudahy.....	819	418	192.3	32.6	5.0	200
107853X	John C. Barr.....	546	315	144.6	28.2	4.8	150
77238X	John J. Healy.....	450	241	175.0	36.0	5.3	200
77296	J. P. Light.....	718	409	176.1	35.4	5.9	300
205169	Julia B.....	835	511	158.7	38.0	6.0	200
161114	Klondyke.....	406	242	120.8	27.5	5.8	(1)
141529X	Lavelle Young.....	506	396	140.0	32.0	6.9	225
141533X	Leon.....	692	346	181.0	36.5	6.7	275
141561X	Linda.....	692	386	181.0	36.5	6.7	275
141572	Louise.....	717	384	165.0	36.5	5.0	(2)
92890X	Margaret.....	520	260	140.0	33.0	7.0	200
93031	Meteor.....	68	40	75.0	18.0	7.0	(1)
92864	Minneapolis.....	235	157	108.6	21.8	4.9	50
92855X	Monarch.....	463	269	149.6	30.3	5.0	200
209341	M. L. Washburn.....	284	179	120.3	26.0	4.1	100
155318X	Oil City.....	718	409	176.1	35.4	5.9	300
150778X	Pilgrim.....	718	409	176.1	35.4	5.9	300
Launch	Pilot ³						
150646X	P. B. Weare.....	400	200	175.0	28.0	4.0	200
204486	Reliance.....	291	171	120.0	25.6	4.6	100
111180	Robt. Kerr.....	718	409	176.1	35.4	5.9	300
116816	St. Michael.....	718	409	176.1	34.5	5.9	300
116856	Sarah.....	1,211	588	222.8	42.0	6.2	475
116817X	Seattle.....	718	409	176.1	34.5	5.9	300
116854X	Seattle No. 3.....	548	326	150.0	32.5	6.0	200
116812	Schwatka.....	484	291	146.0	30.0	5.0	60
116855	Susie.....	1,211	588	222.8	42.0	6.2	475
145773X	Tacoma.....	718	409	176.1	34.5	5.9	300
201820	Tana.....	234	175	106.0	25.4	4.2	100
201297	Tanana.....	495	372	149.6	30.4	5.9	150
145790	T. C. Power.....	819	418	192.3	32.6	5.0	225
116811X	Victoria.....	718	409	176.1	34.5	5.9	300
202409	White Seal.....	193	116	96.8	20.3	5.3	75
81606X	Wilbur Crimmins.....	124	59	80.0	19.4	3.7	25
81758X	Will H. Isom.....	983	619	183.8	36.5	5.6	(4)
163218	Anvik.....	198	198	106.0	24.0	4.6	150
162850	Arizona.....	923	923	161.0	38.0	7.6	500
31593	Bear.....	539	539	143.8	32.5	7.1	⁵ 3,000
162437	Beaver.....	761	416	161.0	39.5	7.6	500
163265	Bill.....	624	624	141.6	36.0	7.0	350
	Camille.....	494	494	150.0	34.0	7.2	350
168956	Caribou.....	186	186	83.0	24.9	4.0	100
162926	Chena.....	502	502	128.8	32.2	6.9	250
162936	Dakota.....	827	827	161.0	38.0	7.6	400
162887	Elk.....	250	250	106.0	37.5	6.3	200
36957	Erie.....	899	899	167.4	37.2	9.8	500
162886	Ermine.....	250	250	106.0	37.5	6.3	200
37573	Fox.....	539	539	143.8	32.5	7.1	300
42857X	Huron.....	899	899	167.4	37.2	9.8	500
162968	Idaho.....	922	922	161.0	38.0	7.6	500
X-O	Illinois.....			60.0	18.0	3.6	50
O	Innoko.....						200
162915	Irene.....	616	616	141.2	36.8	6.1	300
163501	John A.....	738	738	160.0	36.0	7.6	400
164590	Lithgow.....	370	370	140.0	32.0	7.0	250
48626	Lynx.....	539	539	143.8	32.5	7.1	300
162438	Marten.....	761	416	161.0	39.5	7.6	500
163249	McNab.....	633	633	150.0	34.0	7.6	300
51287	Mink.....	539	539	143.8	32.5	7.1	300

¹ Tug.² 4 barges.³ Not documented.⁴ 5 barges.⁵ Oil.

List of American steamers operated on Yukon River from St. Michael, Alaska, via Apoon mouth—Continued.

Official number.	Name.	Tonnage.		Dimensions.			Capacity.
		Gross.	Net.	Length.	Breadth.	Depth.	
				<i>Feet.</i>	<i>Feet.</i>	<i>Feet.</i>	<i>Tons.</i>
164645	Mizzo.....	550	550	150.0	35.6	7.6	350
162796	Montana.....	922	922	161.0	38.0	7.6	500
163152	Moose.....	875	875	159.3	38.0	8.0	500
	Muskrat.....	244	244	120.0	32.0	7.0	375
67380	New York.....	450	450	120.0	28.0	6.0	250
X-O	Nome.....			150.0	34.0	7.0	250
164403	Olympia.....	211	211	91.0	25.0	4.0	150
162851	Omaha.....	344	344	120.0	28.0	5.0	200
53314	Ontario.....	899	899	167.4	37.2	9.8	500
53289	Otter.....	289	289	158.0	32.6	7.1	350
163954	Pete.....	240	240	100.0	26.0	6.6	150
O	Rock Island, No. 2.....			100.3	30.2	5.2	150
162972	Sable.....	186	186	86.0	24.9	4.0	100
57985	St. Michael, No. 3.....	228	228	140.0	33.0	7.5	260
57986	St. Michael, No. 4.....	479	479	170.1	37.6	6.1	¹ 2,600
57998	St. Michael, No. 5.....	350	350	170.0	40.0	6.0	400
58094	St. Michael, No. 7.....	240	240	140.0	32.0	7.5	300
58053	St. Michael, No. 9.....	366	366	180.0	40.0	6.5	¹ 2,600
58054	St. Michael, No. 10.....	240	240	150.0	30.0	6.0	300
O	St. Michael, No. 12.....			100.0	26.0	6.6	150
O	St. Michael, No. 13 (garbage).....			50.0	18.0	4.6	50
X-O	St. Michael, No. 14 (pat).....			50.0	18.0	4.6	50
O	St. Michael, No. 15 (water).....			100.0	26.0	6.6	150
163894	St. Paul.....	494	494	150.0	34.0	7.2	350
57959	Seal.....	289	289	143.8	32.5	7.1	300
116853X	Seattle, No. 1.....	446b	446	148.0	26.0	6.0	200
57992	Seattle, No. 4.....	600	600	155.0	36.0	7.0	300
	Shay.....			110.0	28.0	5.0	150
163283	Skunk.....	251	251	144.0	41.2	4.6	¹ 2,400
163497	Sterling.....	638	638	150.0	38.0	7.0	350
58132	Superior.....	285	285	175.0	38.0	5.6	400
163772	Susitna, No. 1.....	136	136	100.0	30.8	5.4	200
163773	Susitna, No. 2.....	44	44	65.0	20.8	3.8	50
59482X	Tanana.....	383	355	100.3	35.2	5.4	150
162580	Thebo.....	299	299	100.0	30.0	5.5	200
164261	T. H. Trahey.....	494	494	150.0	34.0	7.2	350
163498	Vachon.....	638	638	150.0	38.0	7.0	350
X-O	Yukon.....	383	355	100.3	35.2	5.4	150
163530	Trinder.....	619	619	155.0	35.0	7.6	300
	Weasel.....	244	244	120.0	32.0	7.0	375
163153	Wolverine.....	875	875	159.3	38.0	8.0	500
X-O	Wrecking barge.....			80.0	28.0	5.0	50
O	Water barge.....						40

¹ Oil.

NOTE.—X denotes barges not operated, season of 1913. O denotes barges not documented.

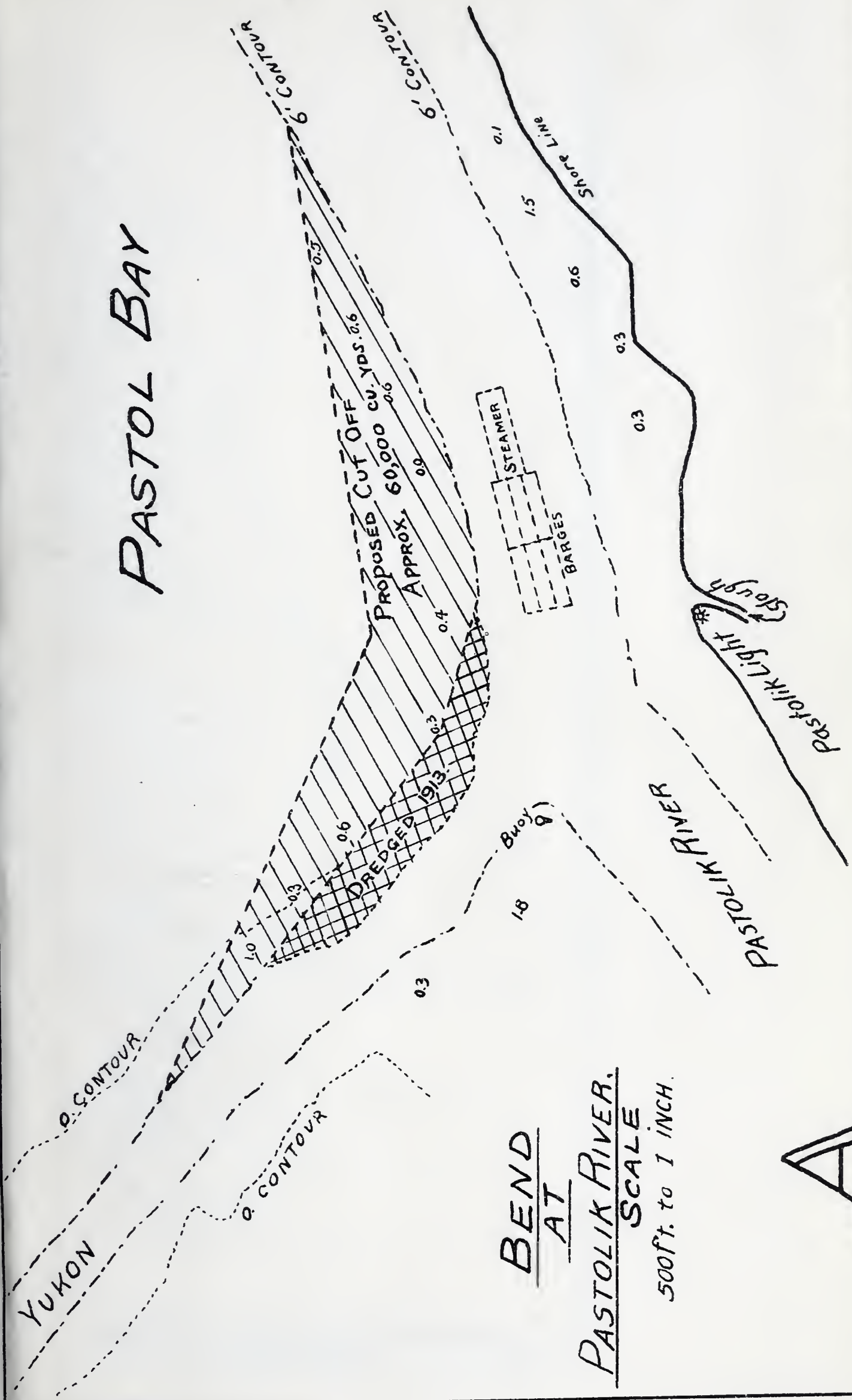
SAN FRANCISCO, CAL., December 19, 1913.

Statistics of business at port of St. Michael—S. F.

	1910	1911	1912	1913
Inward:				
Coal from ocean vessels.....tons..	2,477	2,108	1,416	2,181
Fuel oil (crude) from ocean vessels.....do....	7,345	6,660	6,800	7,073
Live stock.....do.....		1,051	429	
Lumber from ocean vessels.....do....	1,579	1,621	600	564
General merchandise from ocean vessels.....do....	23,742	29,147	23,625	25,575
Foreign merchandise in transit.....do.....	100	1,210	1,195	3,050
Total tonnage from ocean vessels.....do....	35,243	41,797	34,065	38,443
Passengers landed from ocean vessels.....	1,222	835	912	461
Value of domestic goods landed from ocean vessels...	\$3,627,735	\$3,643,375	\$3,202,875	\$3,528,721
Value of foreign goods landed from ocean vessels...	\$25,050	\$159,985	\$144,669	\$413,699
Landed from river boats.....tons.....	160	215	214	291
Landed from coastwise vessels.....do....	47	41	10	60
Value of goods landed from river boats.....	\$97,125	\$101,480	\$101,008	\$112,200
Value of goods landed from coastwise steamers.....	\$13,160	\$11,439	\$1,475	\$71,300
Passengers landed from river boats.....	2,029	1,286	1,417	880
Gold dust and bullion landed from river boats.....	\$1,401,075	\$2,891,204	\$2,596,626	\$1,842,660

Statistics of business at port of St. Michael—S. F.—Continued.

	1910	1911	1912	1913
Inward—Continued.				
Arrivals—				
Ocean steamers.....	124	60	56	47
Ocean sailing vessels.....	1			
Ocean tonnage.....	107,161	99,946	93,553	88,259
River boats.....	57	49	39	32
River barges.....	63	83	59	81
River tonnage (river boats and barges).....	64,404	57,582	47,968	51,067
Outward:				
General merchandise shipped on ocean steamers.....	347	335	710	442
Value of general merchandise shipped on ocean steamers.....	\$141,944	\$137,350	\$215,000	\$200,000
Gold dust and bullion shipped on ocean steamers..	\$1,402,678	\$2,891,204	\$2,596,626	\$1,842,660
Passengers sent out on ocean steamers.....	2,654	1,918	2,093	996
Foreign goods shipped to foreign Yukon River ports.....	100	1,210	1,195	3,050
Domestic goods shipped to foreign Yukon River ports.....	264	925	820	2,156
Fuel oil (crude) shipped to United States Yukon River ports.....	3,716	5,490	3,846	3,335
Live stock.....		1,050	425	
Domestic goods shipped to United States, Yukon, Tanana, and Koyukuk River ports.....	20,382	24,994	18,924	20,982
Total shipped to Yukon, Tanana, and Koyukuk River ports.....	24,462	33,669	25,210	29,523
Passengers sent out on river boats.....	575	390	376	306
Value of foreign goods shipped to foreign Yukon River ports.....	\$25,050	\$159,985	\$144,669	\$413,699
Value of domestic goods shipped to foreign Yukon River ports.....	\$31,680	\$115,625	\$69,200	\$191,199
Value of domestic goods shipped to United States, Yukon, Tanana, and Koyukuk River ports....	\$2,482,100	\$3,124,250	\$2,758,225	\$2,771,090
Total value of merchandise shipped to Yukon, Tanana, and Koyukuk River ports.....	\$2,538,830	\$3,399,860	\$2,972,094	\$3,375,988
Sailings—				
Ocean steamers.....	125	60	56	47
Ocean sailing vessels.....	1			
Ocean tonnage.....	107,222	99,946	93,553	88,259
River boats.....	53	50	38	34
River barges.....	64	95	63	87
River tonnage (river boats and barges).....	66,838	60,778	50,795	52,357
Harbor boats and tugs.....	6	6	4	4
Harbor lighters and barges.....	18	16	12	14
Harbor vessels, tonnage.....	6,675	6,425	4,811	5,241



BEND
AT
PASTOLIK RIVER.
SCALE
500ft. to 1 INCH.

A

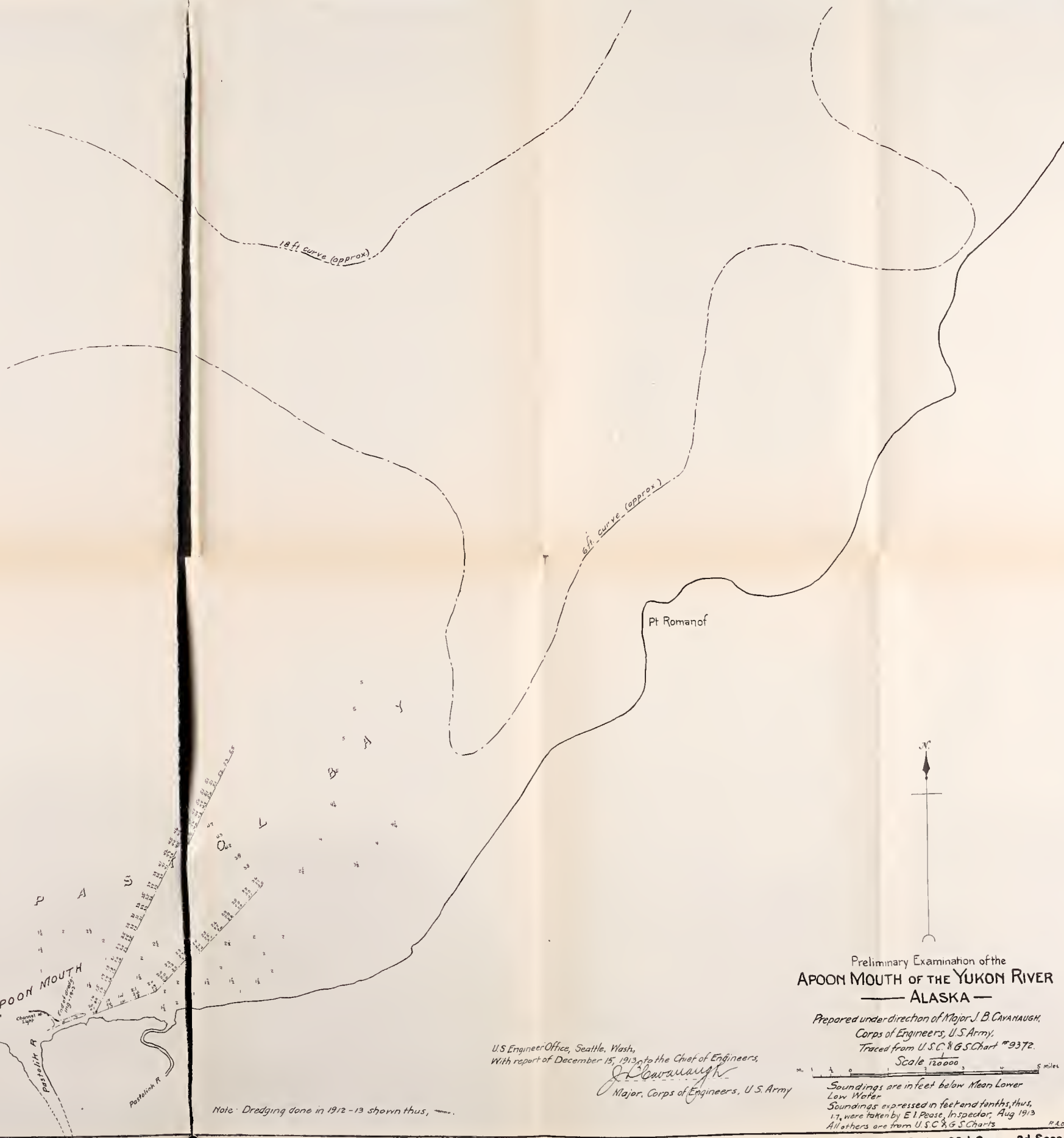
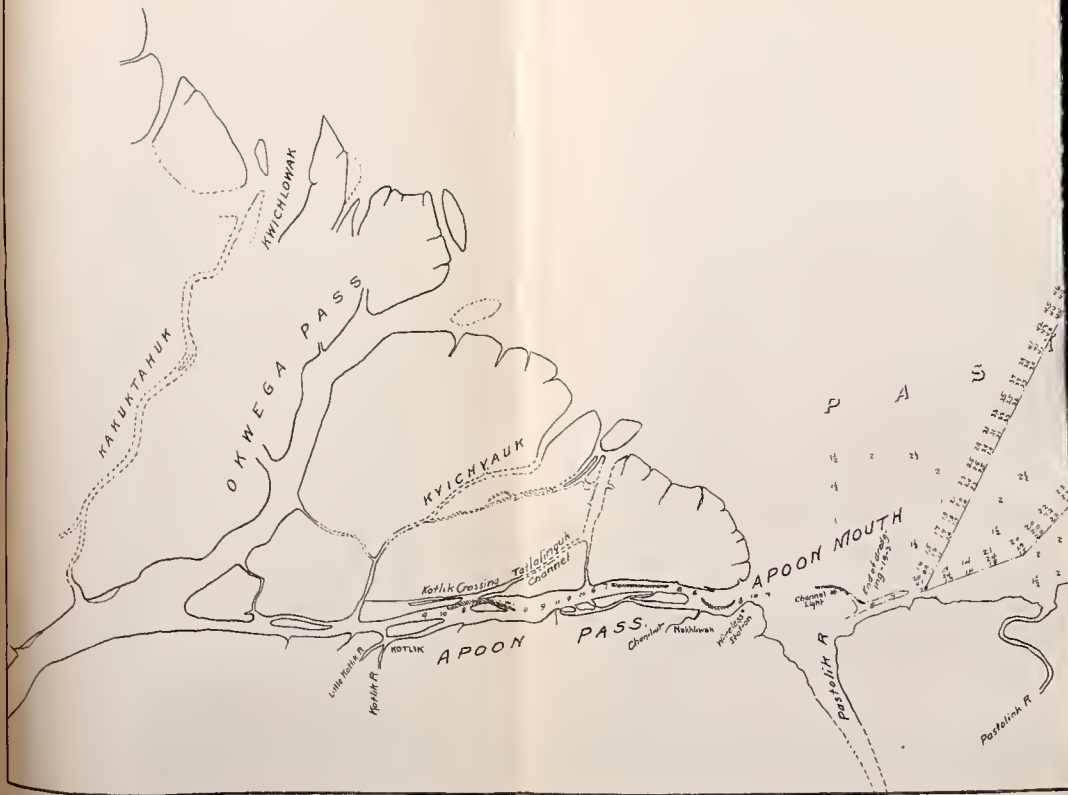
1958 10/24/58



A

B

Geological Section



House Doc. No. 991 ; 63d Cong., 2d Sess.

